Technology Transfer and IP: Lessons Learned from an Academic Entrepreneur

Professor Lee Lynd, Thayer School of Engineering, Dartmouth College; Mascoma Corporation

December 12, 2013

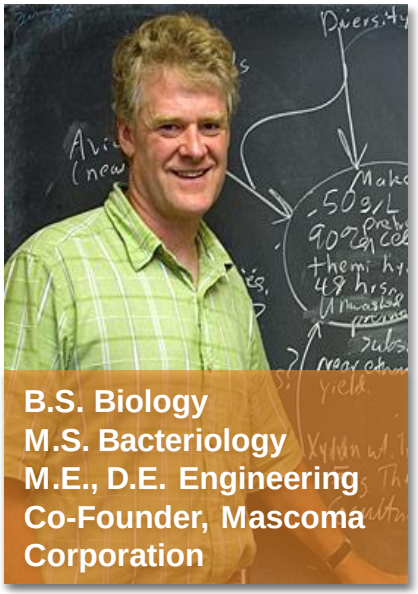
AGENDA

- Overview of Lessons Learned
  - Introduction to Lee Lynd
  - Mascoma Corporation
  - Experiences with Technology Transfer and IP
  - Other Perspectives and Advice
- Moderated Q&A with Josh Gould, ARPA-E Technology-to-Market
- Open Audience Q&A

INTRODUCTION TO PROF. LEE LYND

- **Career oriented along an axis of ends rather than means**

- **Singularly focused on cellulosic biofuels**
  - Worked on continuously since undergraduate thesis (1979)
  - Research in metabolic engineering, microbiology, process innovation, sustainable bioenergy futures
  - Was there when the world came around to me (for a while)



1867

THAYER SCHOOL OF ENGINEERING AT DARTMOUTH

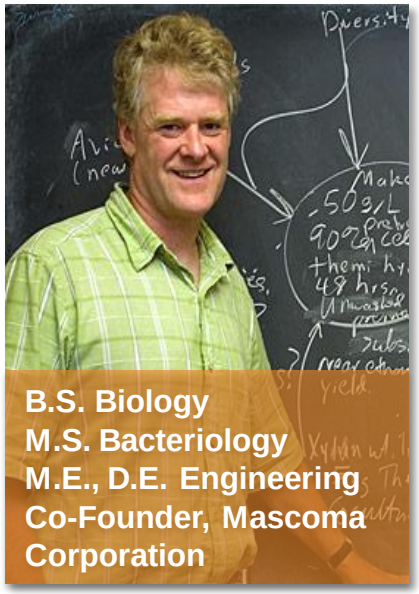
INTRODUCTION, CONTINUED

Motivations

- **General:** Being of service in the context of the "sustainable resource revolution" (following the neolithic and industrial revolutions)
- **Starting a Company:** An obvious thing to do given impact and service motivations

Business Experience Prior to Mascoma

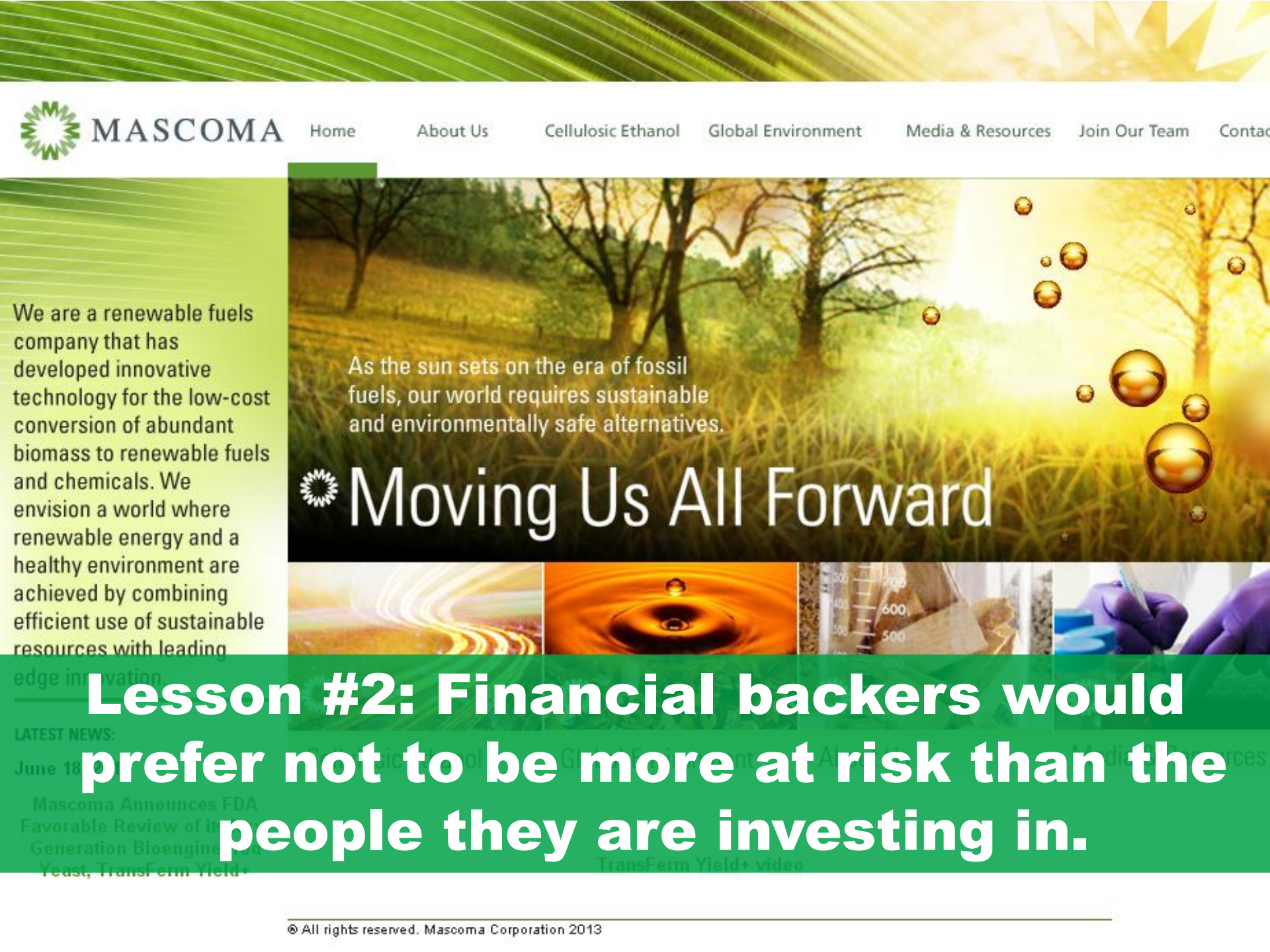
- Tried to start a cellulosic biofuels company from 1991-1995



B.S. Biology
M.S. Bacteriology
M.E., D.E. Engineering
Co-Founder, Mascoma Corporation

MASCOMA


Lesson #1: Timing is a critically important component of entrepreneurship.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We are a renewable fuels company that has developed innovative technology for the low-cost conversion of abundant biomass to renewable fuels and chemicals. We envision a world where renewable energy and a healthy environment are achieved by combining efficient use of sustainable resources with leading
As the sun sets on the era of fossil fuels, our world requires sustainable and environmentally safe alternatives.
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Lesson #2: Financial backers would prefer not to be more at risk than the people they are investing in.
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MASCOMA

- Founded in 2006, along with Charles Wyman & Bob Johnson
- Initial focus on cellulosic ethanol via consolidated bioprocessing
- Total venture investment ~ $150 million
  - Initial investment from Khosla Ventures, Flagship Ventures
  - ~ 75 employees
- Introduced first recombinant yeast into the corn ethanol industry (2012)
  - Initially had a build-own-operate business model, but pivoted to being a technology provider to the renewable fuel industry (both corn and cellulosic)
- Once a near-panacea, the climate for advanced biofuels became less favorable

MASCOMA

khosla ventures
venture assistance, strategic advice, venture capital

FLAGSHIP VENTURES

Lesson #3: Circumstances, opportunities and companies change. The corporate environment is often more dynamic than the academic environment.

EXPERIENCE WITH TECH TRANSFER & IP

- Unusual agreement between Dartmouth and Mascoma upon founding:
  - Dartmouth received founding equity (no royalty)
  - Agreement prospective as well as retrospective with respect to technology from Dr. Lynd's lab
- Dartmouth assessment:
  - In retrospect, might have preferred to have had royalties
  - But would not have received any since no technology from Dr. Lynd's lab has been licensed
- Dr. Lynd's assessment:
  - University and company interest aligned – potentially less so with royalties
  - Good for the technology as there was no royalty price burden
  - Good for Dr. Lynd as a researcher; preserved opportunities to do important things

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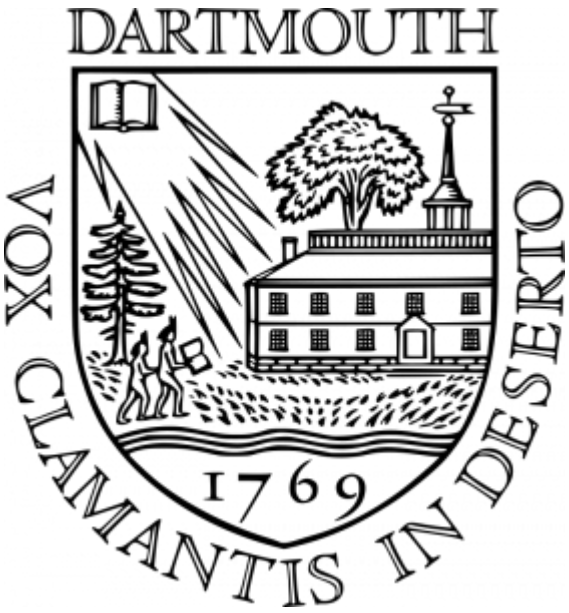
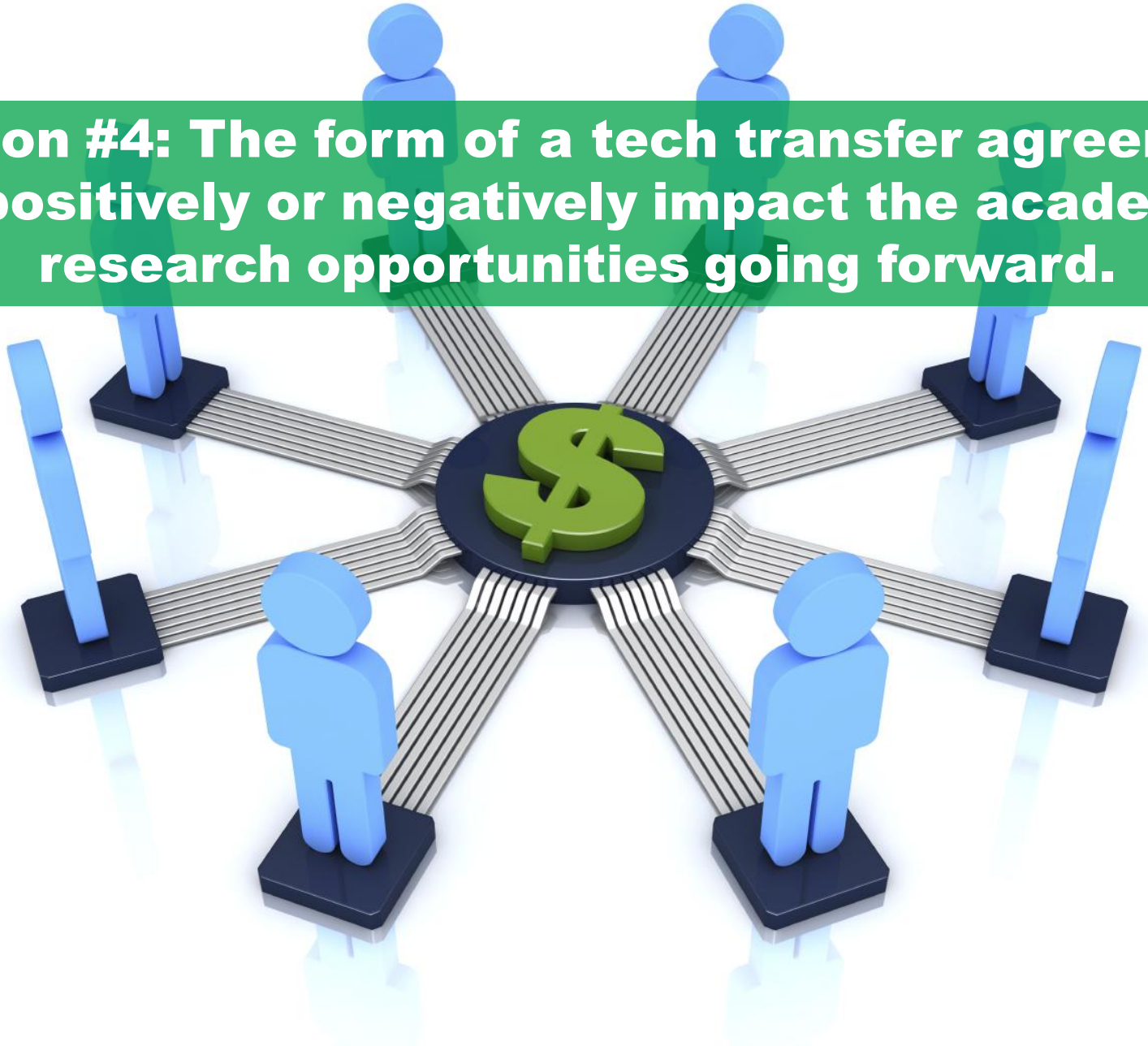
DARTMOUTH



Lesson #4: The form of a tech transfer agreement can positively or negatively impact the academic's research opportunities going forward.

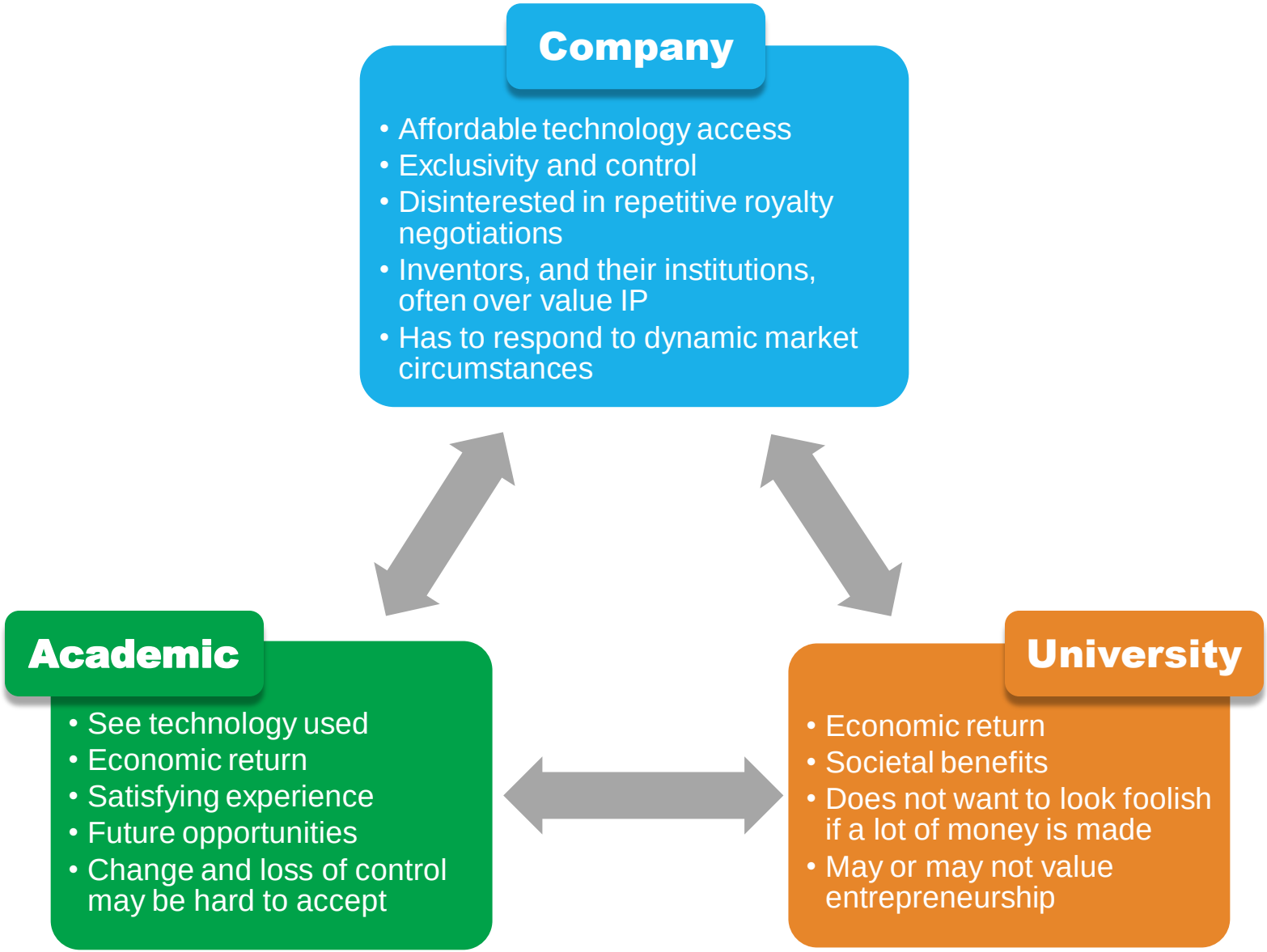


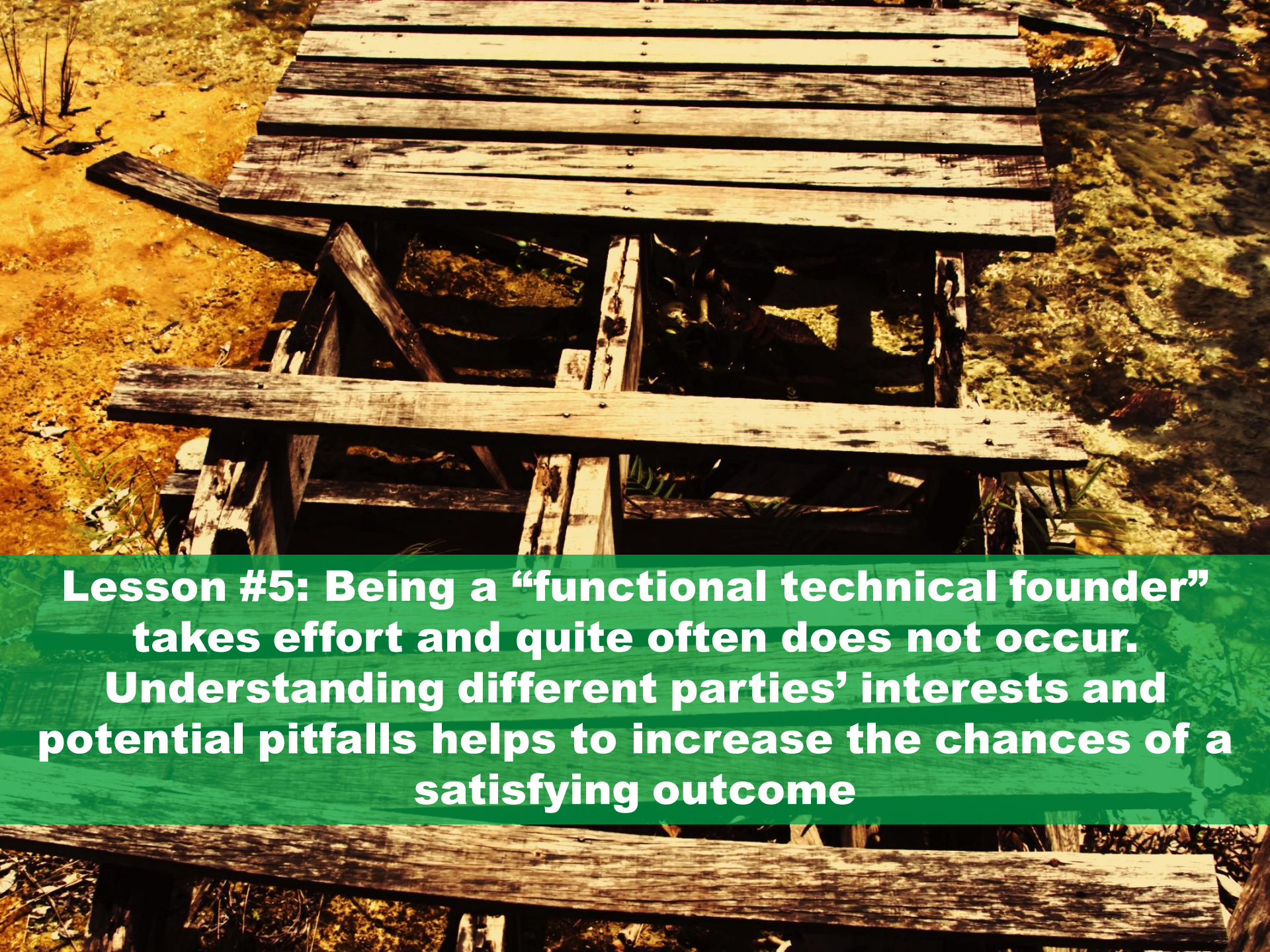
EXPERIENCE WITH TECH TRANSFER & IP

- Had an active research collaboration with another academic lab (institution other than Dartmouth) prior to Mascoma founding
  - Dartmouth negotiated an agreement that included royalties
  - The royalty component harmed the collaboration because Mascoma had the same skills as Dr. Lynd, so Mascoma could interface directly with the collaborator without incurring a royalty

Lesson #4 (again): The form of a tech transfer agreement can positively or negatively impact the academic's research opportunities going forward.

TECH TRANSFER LANDSCAPE





Lesson #5: Being a “functional technical founder” takes effort and quite often does not occur. Understanding different parties’ interests and potential pitfalls helps to increase the chances of a satisfying outcome

OTHER COMMENTS ON BEING AN ACADEMIC ENTREPRENEUR

There is a large range in the receptiveness and permissiveness of different institutions toward entrepreneurial activity. Some, for example, do not let academics become equity-holding officers. Others do.

Let your opinion be known, but do not expect to be in control.

Some activity can legitimately be double-counted by both academic and entrepreneurial missions/masters, and some cannot. It is important to recognize the difference and to be realistic about what you should try to accomplish.

Although you may be new to this arena, be yourself.

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